A LUMINOUS METEOR CLOUD OBSERVED AT URBANA, ILL.

By Prof. C. J. KULLMER. Dated Syracuse University, N. Y., December 14, 1908.

The growing recognition of the importance of meteor observations for the study of upper-air currents leads me to believe that some use may possibly be made of an observation made at Urbana, Ill., November 14, 1904. At $14^h\ 49^m\ 15^s \pm 4^s$ central time appeared in Leo Majoris a bright meteor, the course of which is given at No. 1 in fig. 1; the position was

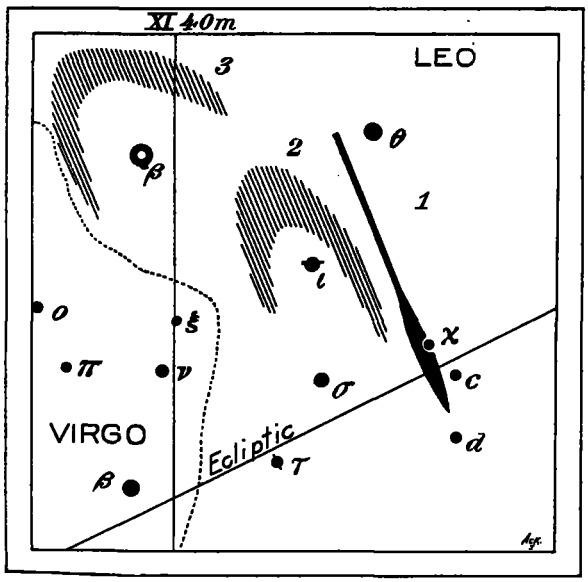

FIG. 1.—Meteor and meteor cloud in Leo Majoris, November 14, 1904.

accurately fixt by the small star triangle. In my note book I wrote: "At first two centers," which, interpreted from memory, means that at the beginning of the shaded part of the line a nucleus was formed; the meteor continuing, however, and forming a second nucleus. No. 2 in fig. 1 shows the position and shape of the luminous cloud while still visible to the naked eye; it remained thus visible for eight minutes, but my notes do not give the time of position No. 2. No. 3, however, shows the position and shape of the cloud at $15^h\ 4^m$ as seen thru an opera glass. This meteor was also observed at the university observatory, one mile to the west, by Dr. Joel Stebbins, who published a note concerning it in Popular Astronomy, vol. 13, p. 56. For the interpretation it may be convenient to add, that an area of high barometric pressure of 30.4 inches was central at longitude 86° west, latitude 36° north, about 300 miles southeast of Urbana, and a marked low pressure of 28.6 inches central at longitude 63° west, latitude 45° north. Other meteors observed at this time were: seven from $12^h\ 45^m$ to $13^h\ 45^m$; thirteen from $14^h\ 10^m$ to $15^h\ 15^m$; twenty-seven from $15^h\ 39^m$ to $16^h\ 39^m$.

THE TRAINING SCHOOL AT TOKYO, JAPAN, FOR METEOROLOGICAL OBSERVERS.

A letter dated November 23, 1908, from Prof. T. Okada, in charge of weather forecasting at the Central Meteorological Observatory, Tokyo, Japan, informs the Editor of the recent establishment and inauguration at that observatory of a training school for meteorological observers. This school is established for the members of the provincial meteorological stations, in order to provide such knowledge as is necessary for discharging their regular duties, and to secure more uniformity as well as a higher standard in their attainments. Apparently the course of instruction must cover several years of work. Observers who are graduates of a high school and have past entrance examinations at this observatory are admitted.

This year the number of students is 17. The courses of lectures are:

1. Mathematics. (Analytical geometry, differential calculus, and exercises.)
2. Physics. (Experimental physics.)
3. Apparatus and methods of observing.
4. Spherical astronomy (including spherical trigonometry.)
5. Seismology.
6. Meteorology (elementary and advanced.)
7. Physical experiments.
8. Meteorological observations.
9. Weather charts.

This extensive course of training at Tokyo covers even more ground than the analogous course established by Gen. William B. Hazen in 1882 for the benefit of the enlisted men under instruction at Fort Myer, Va., full details of which will be found in Annual Report Chief Signal Officer, 1882, Pt. I, p. 97–172. That course was maintained for several years under the special supervision of Prof. Frank Waldo.—*C. A.*

THE CLASS UNDER INSTRUCTION AT WASHINGTON.

A class for the instruction in station duties of newly appointed assistant observers has been established at the Central Office of the Weather Bureau at Washington, D. C. It is the intention, as far as practicable, to give each newly appointed assistant observer at least three months' training in the work done on station, including practise in telegraphy, typewriting, taking and enciphering of observations, preparation of forms, and the care of instruments. There are at present nine assistant observers under instructions.—*H. E. W.*

FORMATION OF DEW AT TREE-TOPS.

A correspondent inquires whether dew collects on the leaves at the tops of high trees so that they are moist at night in the summer time.

The general law with regard to the formation of dew simply requires that the surface on which dew forms shall be so cold that the air in contact with it and gently flowing over it, shall be cooled below its temperature of saturation, or to the temperature that we call the dew-point. This cooling can only be accomplished by radiation of heat from the surface outward thru the air, or by conduction from it inward thru the solid. The latter process is rare in nature, but is well illustrated in using the Regnault dew-point apparatus. The former process is the one ordinarily met with in nature. We think of the air near the ground as cooling slowly by its own radiation downward, since its radiation upward is counteracted, to a large extent, by absorbing the downward radiation from the air above it. Radiant heat has definite wave-lengths characteristic of its origin and these waves, radiating from a given body, are completely absorbed by other masses of the same body, but are not likely to be absorbed by masses of other bodies. When waves of radiation from the sun or the air strike a solid substance and penetrate its outer layer of molecules the latter radiate back heat of other and usually longer wave-lengths, and these pass thru the air with very slight absorption, except in so far as they are stopt by dust and fog or cloud. Thus it happens that the solid surfaces of the ground, vegetation, snow, or ice cool more rapidly than the air above them; the thin layer of air in immediate contact with the surfaces is especially cooled and leaves a little of its moisture on them as it settles down to some lower level by what has happily been called the drainage of cold air.

The rate of cooling by radiation increases in proportion as the surface is thermally insulated or cut off from receiving heat by conduction from the ground below; and also in proportion as it is more freely exposed to the clear blue sky above. Not only do clouds reflect back the heat radiated outward,